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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
NGUYEN, PHU K	
ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/329,557	HEINRICH ET AL.	
	Examiner	Art Unit	
	Phu K. Nguyen	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-83* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *31-66* is/are allowed.

6)☒ Claim(s) *1,5-9,13-17,21-26,28-30 and 67-83* is/are rejected.

7)☒ Claim(s) *2-4, 10-12, 18-20, 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 25-27, 29-30 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101"). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claims 17-24, and 51-60, and 65-66 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a computer readable medium or a computer product asserted utility or a well established utility.

The claimed computer readable medium can be interpreted as the wave carriers of the transmitted signals per se which has physical characteristics of a form of energy, such as frequency, voltage, or the strength of a magnetic field, define energy or magnetism. It is a nonstatutory natural phenomena O'Reilly, 56 U.S. (15 How.) at 112-14. The claimed program codes are just functional descriptions of the computer instructions which are descriptive material per se and are not statutory because they are

not capable of causing functional change in the computer. See Lowry, 32 F.3d at 1583-84. In claim 17, the computer usable medium can be "communication network" (Disclosure, page 27, lines 13-17) which is wave carriers of transmitted signals, and the computer code is just the description or expression of the non-physical codes. Accordingly, the claims 17-24, 51-60, and 65-66 are non-statutory under 35 USC 101.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 5-9, 13-17, 21-26, 28-30, 73-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over JOUPPI et al. (EP 0 910 047 A2) in view of COOK et al. (4,897,806).

As per claim 1, Jouppi teaches the claimed "method of displaying a first image on a display device, the display device having a plurality of pixels, each pixel having a unique location on the display device", the method comprising: "assigning one of a plurality of sample patterns to each pixel on the display device, each sample pattern having at least one sample location" (Jouppi, pixel 300, figure 3, paragraph [0031]); "determining if the first image intersects any of the sample locations on each pixel" (Jouppi, column 8, lines 37-42); and "illuminating pixels determined to have at least one sample location that intersects the first image" (Jouppi, column 9, lines 43-48). It is

noted that Jouppi does not teach "each pixel being assigned the one of a plurality of sample patterns based upon its unique location on the display device." However, such feature is known in the art as stochastic sampling and widely used in the art (Cook, stochastic sampling with sample positions depends on the pixel's coordinates; column 5, lines 26-61). Given Jouppi's stochastic sampling with a uniform distribution on the sample positions (paragraph [0030]), it would have been obvious to use other pseudo-random distribution to generate a unique random number based on input coordinate of the pixel (discussed in Applicant's disclosure page 14, lines 8-10, such as Perlin Noise function or Poission disk distribution - Cook, column 7, line 19, or column 8, line 46-47). The motivation for use such pseudo-random distributions is to reduce the number of sample below the Nyquist rate, but still maintain the quality for the image (Cook, column 7, lines 11-30).

Claim 5 adds into claim 1 "wherein attribute data comprises color data" which Jouppi teaches in column 12, line 53 to column 13, line 7.

Claim 6 adds into claim 1 "the first and second sample patterns with different sample locations" (Jouppi, [0031]; Cook, column 5, lines 26-61).

Claims 7 and 8 add into claim 1 using the pixel coordinate as index for "a lookup table to locate the sample patterns" which Cook teaches in column 5, lines 11-15.

As per claim 25, Jouppi teaches the claimed "method of illuminating a pixel on a display device", the method comprising: "detecting one or more images that intersect

the pixel" (Jouppi, pixel 300, figure 3); "providing attribute data and depth data for its image on the pixel" (Jouppi, fragment values include color and depth values, [0036], [0040]); see also column 8, lines 37-42; paragraph [0082]); "calculating a weighted pixel attribute average for the attribute data of all slots, the weighted average being calculated each time a new slot is generated" (Jouppi, column 13, lines 26-43) and "utilizing the weighted average to illuminate the pixel each time the weighted average is calculated" (Jouppi, column 9, lines 43-48, [0053]). It is noted that Jouppi does not explicitly teach "data slot for each image that intersects the pixel," however, in case of a pixel representing a part of a polygon, the data slot to store in the memory for the polygon including attribute data and depth data is well known in the art (Cook, the storage of polygon include the pixels on the edges; column 3, lines 49-52, column 4, lines 1-7). It would have been obvious, given Cook's slot of data for the polygon, to provide "slot data" for Jouppi's fragment data such as color and depth data. The motivation to provide "data slot" for the image that intersects the pixel is to determine the color and intensity of each pixel of the image (column 4, lines 1-24).

RESPONSE TO APPLICANT'S ARGUMENTS:

Applicant's arguments filed May 3, 2007 have been fully considered, but they are moot due to new ground of rejection.

In claims 1, 5, 9, 13, 17, 21, and 73-80, Applicant argues that Jouppi does not teach "each pixel being assigned the one of a plurality of sample patterns based upon its unique location on the display device." Jouppi's sample pattern is a stochastic sampling process with the random distribution is a random function which fails to teach

"based upon the pixel's unique location on the display." However, Cook teaches that the random distribution in the stochastic process can be selected to provide the sampling pattern which is "based upon the pixel's unique location on the display" (Cook, stochastic sampling with sample positions depends on the pixel's coordinates; column 5, lines 26-61; see also Poission disk distribution, Cook, column 7, line 19, or column 8, line 46-47).

Applicant argues that Jouppi does not teach "providing data slot for each image that intersects the pixels" which Examiner uses the Cook reference to show that "data slot" for image or the polygon is well known in the art in term of attribute data (e.g., color) or depth data (z-coordinate) (Cook, the storage of polygon include the pixels on the edges; column 3, lines 49-52, column 4, lines 1-7).

Furthermore, Applicant argues that Jouppi does not teach "the weight average to illuminate the pixel" which is not correct. Jouppi's filter function ([0053]) is a weight average algorithm to combine the contributions of sub-pixels on the illumination of the display pixel. Jouppi's example of average the color of the fragments ([0053]) is a simple case of average weight in which the weights are equally distributed (i.e., ¼). Furthermore, Cook also teaches about the weight average in illuminating the pixel in column 4, lines 20-24.

Claim 26 adds into claim 25 "a coverage mask defining the amount of image covering the pixel and the weight pixel attribute average" which are taught by the cited references. Jouppi's filter function ([0053]) is a weight average algorithm to combine the contributions of sub-pixels on the illumination of the display pixel. Jouppi's example

of average the color of the fragments ([0053]) is a simple case of average weight in which the weights are equally distributed (i.e., ¼). Furthermore, Cook also teaches about the weight average in illuminating the pixel in column 4, lines 20-24.

Claim 28 adds into claim 25 "wherein each data slot is stored in memory as a list" (Jouppi, figures 6A and 6C).

Claim 29 adds into claim 25 "a coverage mask identifying sample locations" (Cook, stochastic sampling on a mask area of the pixel with sample positions depends on the pixel's coordinates; column 5, lines 26-61).

Claim 30 adds into claim 29 "the first and second sample patterns with different sample locations" (Jouppi, [0031]; Cook, column 5, lines 26-61).

As per claim 73, Jouppi teaches the claimed "graphics processor, for use with a computer system, for generating antialiased graphical images, the computer system having a central processing unit, a display device, and a system bus for coupling the graphics processor with the central processing unit and the display device, the display device including a plurality of pixels", the graphics processor comprising: "a system bus interface that receives polygon data from the central processing unit, the polygon data including vertex data that defines a polygon" (Jouppi, system 100, figure 1); "a subpixel

sample location generator for generating a plurality of sets of subpixel sample locations" (Jouppi, pixel 300, figure 3); "a rasterizer that receives the polygon data and determines, by accessing the memory, which of the subpixel sample locations on each pixel are covered by the polygon" (Jouppi, column 8, lines 37-42; paragraph [0082]; column 13, lines 26-43, column 9, lines 43-48). It is noted that Jouppi does not teach "each set of subpixel sample locations being associated with one of the pixels and having values that are dependent upon the location of the associated pixel." However, such feature is known in the art as stochastic sampling and widely used in the art (Cook, stochastic sampling with sample positions depends on the pixel's coordinates; column 5, lines 26-61). Given Jouppi's stochastic sampling with a uniform distribution on the sample positions (paragraph [0030]), it would have been obvious to use other pseudo-random distribution to generate a unique random number based on input coordinate of the pixel (discussed in Applicant's disclosure page 14, lines 8-10, such as Perlin Noise function or Poission disk distribution - Cook, column 7, line 19, or column 8, line 46-47). The motivation for use such pseudo-random distributions is to reduce the number of sample below the Nyquist rate, but still maintain the quality for the image (Cook, column 7, lines 11-30).

Claim 74 adds into claim 73 "wherein the subpixel sample location generator defines a plurality of subpixel regions on each pixel, further wherein each subpixel region in a given pixel includes one of the subpixel sample locations in one set of subpixel sample locations" (Jouppi, paragraphs [0065]-[0066]).

Claim 75 adds into claim 73 "wherein the rasterizer includes a pixel value determiner that determines the color value of each pixel on the display device" (Jouppi, paragraph [0073]).

Claim 76 adds into claim 73 "wherein the pixels having sample locations that are covered by the polygon are included in a set of pixels, the rasterizer determining pixel attributes of each pixel in the set of pixels based upon the number of covered sample locations within each pixel" (Jouppi, paragraphs [0065]-[0066]).

Claim 77 adds into claim 76 "the attributes include color, transparency and intensity information" (Jouppi, paragraph [0078]).

Claim 78 adds into claim 77 "the attributes include depth coordinate information" (Jouppi, paragraph [0072]).

Claim 79 adds into claim 73 "wherein the subpixel sample location generator includes a look-up table" (Cook, paragraph [0022]).

Claim 80 adds into claim 73 "wherein the sets of subpixel sample locations are identical for selected pixels on the display device" (Jouppi, the pixels in the display having the same pattern with pixel 300).

Claims 81-83 add into claim 73 the characteristics of the sample locations such as different locations and pixels having different sets of sample locations (Cook, stochastic sampling with sample positions depends on the pixel's coordinates; column 5, lines 26-61).

As per claim 9, Jouppi teaches the claimed "apparatus for displaying a first image on a display device, the display device having a plurality of pixels, each pixel having a unique location on the display device", the apparatus comprising: "a pattern assignor that assigns one of a plurality of sample patterns to each pixel on the display device, each sample pattern having at least one sample location" (Jouppi, pixel 300, figure 3); "an image detector operatively coupled to the pattern assignor, the image detector determining if the first image intersects any of the sample locations on each pixel" (Jouppi, column 8, lines 37-42); and "a pixel illuminator operatively coupled with the image detector, the pixel illuminator illuminating pixels determined to have at least one sample location that intersects the first image" (Jouppi, column 9, lines 43-48). It is noted that Jouppi does not teach "each pixel being assigned the one of a plurality of sample patterns based upon its unique location on the display device." However, such feature is known in the art as stochastic sampling and widely used in the art (Cook, stochastic sampling with sample positions depends on the pixel's coordinates; column

5, lines 26-61). Given Jouppi's stochastic sampling with a uniform distribution on the sample positions (paragraph [0030]), it would have been obvious to use other pseudo-random distribution to generate a unique random number based on input coordinate of the pixel (discussed in Applicant's disclosure page 14, lines 8-10, such as Perlin Noise function or Poission disk distribution - Cook, column 7, line 19, or column 8, line 46-47). The motivation for use such pseudo-random distributions is to reduce the number of sample below the Nyquist rate, but still maintain the quality for the image (Cook, column 7, lines 11-30).

Claim 13 adds into claim 9 "wherein attribute data comprises color data" which Jouppi teaches in column 12, line 53 to column 13, line 7.

As per claim 17, Jouppi teaches the claimed "computer program product for use with a computer system for displaying a first image on a display device, the display device having a plurality of pixels, each pixel having a unique location on the display device, the computer program product comprising a computer usable medium having computer readable program code thereon", the computer readable program code including: "program code for assigning one of a plurality of sample patterns to each pixel on the display device, each sample pattern having at least one sample location" (Jouppi, pixel 300, figure 3); "program code for determining if the first image intersects any of the sample locations on each pixel" (Jouppi, column 8, lines 37-42); and

"program code for illuminating pixels determined to have at least one sample location that intersects the first image" (Jouppi, column 9, lines 43-48). It is noted that Jouppi does not teach "each pixel being assigned the one of a plurality of sample patterns based upon its unique location on the display device." However, such feature is known in the art as stochastic sampling and widely used in the art (Cook, stochastic sampling with sample positions depends on the pixel's coordinates; column 5, lines 26-61). Given Jouppi's stochastic sampling with a uniform distribution on the sample positions (paragraph [0030]), it would have been obvious to use other pseudo-random distribution to generate a unique random number based on input coordinate of the pixel (discussed in Applicant's disclosure page 14, lines 8-10, such as Perlin Noise function or Poission disk distribution - Cook, column 7, line 19, or column 8, line 46-47). The motivation for use such pseudo-random distributions is to reduce the number of sample below the Nyquist rate, but still maintain the quality for the image (Cook, column 7, lines 11-30).

Claim 21 adds into claim 17 "wherein attribute data comprises color data" which Jouppi teaches in column 12, line 53 to column 13, line 7.

Due to the similarity of claims 14-16, 21-24 to claims 5-8, they are rejected under the same reason.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 67-72 are rejected under 35 U.S.C. 102(b) as being anticipated by Jouppi et al..

As per claim 67, Jouppi teaches the claimed "pixel data storage apparatus for storing pixel data for a given pixel on a display device, the pixel data storage apparatus storing pixel data for a given image that intersects the given pixel" (Jouppi, [0038], [0040]), "the given pixel having one or more sample locations" (Jouppi, [0031]), the pixel data storage apparatus comprising:

"a coverage mask that stores intersection information relating to the sample locations intersected by the given image" (Jouppi, column 8, lines 23-27);

"an attribute data field that stores attribute data for the given image" (Jouppi, fragment values include color and depth values, [0036], [0040]); see also column 8, lines 37-42; paragraph [0082]); and

"a pointer that points to one of a terminator value and another pixel data storage apparatus" (Jouppi, pointers 320-326; [0044], column 8, lines 2-4).

Claim 68 adds into claim 67 "wherein the terminator value is a null value" (Jouppi, [0032], [0044], [0045]).

Claim 69 adds into claim 67 "wherein the attribute data includes depth data relating to the depth of the given image" (Jouppi, column 6, lines 48-49).

Claim 70 adds into claim 67 "the attribute data includes color data relating to the color of the given image" (Jouppi, color value 304, [0036]).

Claim 71 adds into claim 67 "wherein each sample location has an associated bit in the coverage mask" (Jouppi, bit pattern; column 8, lines 24-27).

Claim 72 adds into claim 67 "including a sample reduction field for storing data indicating that the total number of sample locations is less than a maximum number of samples" (Jouppi, only need N samples within NxN area, column 6, lines 15-36).

Claims 2-4, 10-12, 18-20, 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 31-66 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu K. Nguyen whose telephone number is (571) 272 7645. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (571) 272 7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Phu K. Nguyen/
Primary Examiner, Art Unit 2628